APPENDIX - I
VISCREEN ANALYSIS

Trinity Consultants

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VIA E-MAIL : T.Hornyak@rehinc.com

April 25, 2008

Mr. Tom Hornyak
Refined Energy Holdings, LLC
621 17th Street, Suite 1640
Denver, Colorado 80293

RE: VISCREEN Model – Visibility Analysis at Craters of the Moon National Monument
Southeast Idaho Energy, LLC – Greenfield Facility, American Falls, Idaho
Trinity Project Number 074801.0041

Dear Mr. Hornyak:

Trinity Consultants (Trinity) prepared a visibility analysis for the proposed coal gasification and fuel and fertilizer manufacturing plant to be owned and operated by Southeast Idaho Energy, LLC (SIE), a subsidiary of Refined Energy Holdings, LLC (REH). This greenfield facility will be located near American Falls, Idaho.

BACKGROUND

In July 2007, SIE submitted an Authorization to Construct (ATC) request to the Idaho Department of Environmental Quality (IDEQ) for a greenfield coal gasification and fuel and fertilization manufacturing facility. In subsequent correspondence between SIE and the IDEQ, it was determined that further analysis was needed to determine the visibility impact the facility would have on the surrounding Class I areas. IDEQ also recommended the use of the EPA's VISCREEN model to determine the visibility impact.

As such, Trinity modeled the proposed facility's visibility impacts at the closest Class I area using the VISCREEN model. Note that Craters of the Moon National Monument, located 74.7 kilometers from the greenfield site, is the closest Class I area.

VISCREEN MODEL

The VISCREEN model is designed to determine whether a plume from a facility may be visible from a given vantage point. The primary variables that affect whether a plume is visible or not at a certain location are the quantity of emissions, the types of emissions, the relative location of the emission source and the observer, and the background visibility range. Trinity followed the guidelines published in the *Workbook for Plume Visual Impact Screening and Analysis* when determining the required inputs for the VISCREEN Model.[1]

[1] U.S. EPA, *Workbook for Plume Visual Impact Screening and Analysis*, EPA-450/4-88-015, 1988.

The VISCREEN model can be applied in two successive levels of screening (Level 1 and Level 2). Level 1 screening assumes default particle size and density, and worst-case meteorological conditions of category F stability and 1.0 m/s wind speed. Level 2 screening allows user-specified particle size, density, and worst-case meteorological conditions.

When using either the Level 1 or Level 2 VISCREEN model procedures, the results from the VISCREEN model include the color difference parameter (Delta E) and the green contrast value. The Delta E value was developed to specify the perceived magnitude of color and brightness changes and is used as the primary basis for determining the perceptibility of plume visual impacts in a screening analysis. The green contrast value is the contrast at a given wavelength of two colored objects such as a plume/sky or plume/terrain.

LEVEL I VISCREEN INPUT PARAMETERS

The primary pollutants of concern are particulate matter (PM), nitrogen oxides as nitrogen dioxide (NO_2), primary NO_2, soot, and primary sulfate (SO_4). Generally, primary NO_2, soot, and primary SO_4 are assumed to be zero. However, primary NO_2 and SO_4 are expected at the coal gasification and fuel and fertilizer manufacturing plant due to the presence of nitric acid and sulfuric acid in some units. Soot emissions are assumed to be zero.

Table 1 contains the maximum hourly emission rates necessary to run the VISCREEN model.[2]

TABLE 1. MAXIMUM HOURLY EMISSION RATES

	PM (lb/hr)	NO_x† (lb/hr)	NO_2† (lb/hr)	Soot (lb/hr)	SO_4 (lb/hr)
SIE facility	16.32	67.84	0.94	0.00	0.84

† Total NO_X emissions from the facility are expected to be 68.78 lb/hr. However, 0.94 lb/hr of the 67.84 lb/hr are assumed to be direct emissions of NO_2. As such, the NO_x emissions were recalculated accordingly.

Additional required inputs to the VISCREEN model include the distance between the proposed emissions source and the following three items:[3]

1. The observer: This distance was conservatively assumed to be the same as the distance between the proposed emission source and the closest Class I boundary,
2. The closest Class I boundary: The proposed emission source is expected to be 74.7 kilometers from the closest Class I boundary, and
3. The most distant Class I boundary: The proposed emission source is expected to be 85.7 kilometers from the farthest Class I boundary.

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[2] Note the emission rates are different than those presented in the July 2007 ATC request to IDEQ. Updated emission rates were provided by Mr. Tom Hornyak (REH) in an email to Ms. Melissa Hillman (Trinity) on April 22, 2008.

[3] These distances were chosen using the procedures described in U.S. EPA, *Workbook for Plume Visual Impact Screening and Analysis*, EPA-450/4-88-015, 1988.

Finally, the background visual range value was conservatively assumed to be 110 kilometers.[4] The VISCREEN input parameters, as shown in the VISCREEN modeling files, are presented in Attachment 1.

LEVEL I VISCREEN RESULTS

Trinity ran the VISCREEN model using the input parameters described above and default values such as the particle size and density and worst case meteorological condition of F stability and 1.0 meter per second wind speed.

The default thresholds used when determining if results are favorable, include the following:

- A Delta E value of less than or equal to 2, and
- A green contrast value of less than or equal to the absolute value of 0.05.

Table 2 contains the results within the boundary of the Craters of the Moon National Monument from the VISCREEN model.

TABLE 2. LEVEL I VISCREEN RESULTS WITHIN THE CLASS I AREA

	Delta E	Green Contrast
SKY (forward)	0.451	0.003
SKY (backward)	0.237	-0.005
TERRAIN (forward)	0.391	0.005
TERRAIN (backward)	0.068	0.002

All Delta E and green contrast values are below the respective thresholds. Therefore, the visibility impacts at the Craters of the Moon National Monument, and all Class I areas that are located further away from the greenfield facility, are not expected to be significant.

The VISCREEN results, as shown in the VISCREEN modeling files, are presented in Attachment 1. Note that only results "inside" the receptor area were considered in this analysis, as the area "outside" the receptor area is generally not protected.

CONCLUSIONS

Because the Level I VISCREEN analysis predicts impacts lower than the screening criteria thresholds, a Level 2 VISCREEN analysis was not necessary. It is anticipated that visibility at the surrounding Class I areas will not be impacted as a result of the proposed construction of SIE's coal gasification and fuel and fertilizer manufacturing plant.

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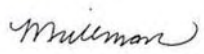
[4] Figure 9 of U.S. EPA, *Workbook for Plume Visual Impact Screening and Analysis*, EPA-450/5-88-015, 1988.

If you have any questions or comments about the information presented in this letter, please do not hesitate to call me at (253) 867-5600.

Sincerely,

TRINITY CONSULTANTS



Melissa Hillman
Senior Consultant

Attachments

cc: Mr. Aaron Day, P.E., CM, Trinity Consultants (Kent, WA)
Ms. Anna Henson, Trinity Consultants (Kent, WA)

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ATTACHMENT 1

VISCREEN Modeling Files

Visual Effects Screening Analysis for
Source: SIE
Class I Area: Crater of the Moon

*** Level-1 Screening ***

Input Emissions for

Particulates	2.06	G	/S
NOx (as NO2)	8.55	G	/S
Primary NO2	.12	G	/S
Soot	.00	G	/S
Primary SO4	.11	G	/S

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	110.00 km
Source-Observer Distance:	74.70 km
Min. Source-Class I Distance:	74.70 km
Max. Source-Class I Distance:	85.70 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	74.7	84.	2.00	.451	.05	.003
SKY	140.	84.	74.7	84.	2.00	.237	.05	-.005
TERRAIN	10.	84.	74.7	84.	2.00	.391	.05	.005
TERRAIN	140.	84.	74.7	84.	2.00	.068	.05	.002

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	0.	1.0	169.	4.90	2.404	.09	.025
SKY	140.	0.	1.0	169.	2.08	.607	.09	-.018
TERRAIN	10.	0.	1.0	169.	4.77	2.624	.09	.026
TERRAIN	140.	0.	1.0	169.	2.04	.895	.09	.024

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"SIE                    "
"Crater of the Moon     "
    1    1
     2.060     8.550      .120      .000      .110
    74.700    74.700    85.700   110.000
    1     1.500    3
    1     2.500    8
    1     2.500    6
    1     2.000    1
    1     1.500    4
    1      .040     1.000    6
    1    11.250
 34
  1 0     5.0  163.8   23.3   52.1   61.9  .30   .050   2.00    .85   2.00    .25   2.00    .81   2.00    .24
  2 0    10.0  158.8   35.8   40.2   53.2  .45   .050   2.00    .91   2.00    .28   2.00    .77   2.00    .20
  3 0    15.0  153.8   43.7   32.9   47.0  .57   .050   2.00    .93   2.00    .32   2.00    .76   2.00    .18
  4 0    20.0  148.8   49.2   28.1   42.3  .69   .050   2.00    .83   2.00    .31   2.00    .68   2.00    .15
  5 0    25.0  143.8   53.4   24.6   38.8  .81   .050   2.00    .76   2.00    .31   2.00    .63   2.00    .13
  6 0    30.0  138.8   56.6   22.1   36.0  .91   .050   2.00    .70   2.00    .31   2.00    .59   2.00    .12
  7 0    35.0  133.8   59.3   20.2   33.9 1.01   .050   2.00    .66   2.00    .30   2.00    .57   2.00    .11
  8 0    40.0  128.8   61.6   18.7   32.2 1.10   .050   2.00    .62   2.00    .29   2.00    .54   2.00    .11
  9 0    45.0  123.8   63.5   17.5   30.9 1.18   .050   2.00    .58   2.00    .29   2.00    .53   2.00    .10
 10 0    50.0  118.8   65.3   16.6   30.0 1.25   .050   2.00    .56   2.00    .28   2.00    .51   2.00    .10
 11 0    55.0  113.8   66.9   15.9   29.3 1.32   .050   2.00    .53   2.00    .27   2.00    .49   2.00    .09
 12 0    60.0  108.8   68.3   15.4   28.8 1.37   .050   2.00    .51   2.00    .26   2.00    .47   2.00    .09
 13 0    65.0  103.8   69.7   15.0   28.6 1.41   .050   2.00    .50   2.00    .26   2.00    .46   2.00    .08
 14 0    70.0   98.8   71.0   14.7   28.6 1.44   .050   2.00    .48   2.00    .25   2.00    .44   2.00    .08
 15 0    75.0   93.8   72.3   14.6   28.8 1.46   .050   2.00    .47   2.00    .25   2.00    .42   2.00    .07
 16 0    80.0   88.8   73.6   14.6   29.3 1.47   .050   2.00    .46   2.00    .24   2.00    .41   2.00    .07
 17 1    85.0   83.8   74.9   14.7   30.0 1.47   .050   2.00    .45   2.00    .24   2.00    .39   2.00    .07
 18 1    90.0   78.8   76.2   14.9   30.9 1.45   .050   2.00    .44   2.00    .23   2.00    .37   2.00    .06
 19 1    95.0   73.8   77.5   15.2   32.2 1.43   .050   2.00    .44   2.00    .23   2.00    .35   2.00    .06
 20 1   100.0   68.8   78.9   15.6   33.9 1.39   .050   2.00    .43   2.00    .22   2.00    .33   2.00    .06
 21 1   105.0   63.8   80.5   16.2   36.0 1.34   .050   2.00    .43   2.00    .22   2.00    .31   2.00    .05
 22 1   110.0   58.8   82.1   17.0   38.8 1.28   .050   2.00    .42   2.00    .21   2.00    .28   2.00    .05
 23 1   115.0   53.8   84.0   18.1   42.3 1.22   .050   2.00    .42   2.00    .20   2.00    .25   2.00    .04
 24 0   120.0   48.8   86.0   19.4   47.0 1.14   .050   2.00    .42   2.00    .19   2.00    .22   2.00    .04
 25 0   125.0   43.8   88.5   21.1   53.2 1.06   .050   2.00    .41   2.00    .18   2.00    .19   2.00    .03
 26 0   130.0   38.8   91.4   23.3   61.9  .96   .050   2.00    .40   2.00    .17   2.00    .15   2.00    .03
 27 0   135.0   33.8   95.1   26.2   74.7  .86   .050   2.00    .38   2.00    .15   2.00    .11   2.00    .02
 28 0   140.0   28.8   99.8   30.3   95.1  .75   .050   2.00    .35   2.00    .13   2.00    .06   2.00    .01
 29 0   145.0   23.8  106.4   36.2  132.1  .64   .050   2.00    .31   2.00    .10   2.00    .02   2.00    .00
 30 0   150.0   18.8  116.2   45.3  219.0  .52   .050   2.00    .25   2.00    .07   2.00    .00   2.00    .00
 31 0   155.0   13.8  132.8   61.3  655.4  .39   .050   2.00    .16   2.00    .05   2.00    .00   2.00    .00
 32 0      .2  168.6    1.0   73.7   74.2  .05   .087   4.90   2.40   2.08    .61   4.77   2.62   2.04    .90
 33 1    84.4   84.4   74.7   14.6   29.9 1.47   .050   2.00    .45   2.00    .24   2.00    .39   2.00    .07
 34 1   119.2   49.5   85.7   19.2   46.1 1.15   .050   2.00    .42   2.00    .20   2.00    .23   2.00    .04
 34
  1 0   5.000   .050   .007   .010  -.010   .008  -.002   .005  -.009   .005   .012   .014  -.009   .010
  2 0  10.000   .050   .007   .010  -.011   .007  -.002   .006  -.012   .006   .011   .013  -.008   .008
  3 0  15.000   .050   .007   .010  -.011   .006  -.002   .007  -.014   .006   .011   .012  -.008   .007
  4 0  20.000   .050   .006   .009  -.009   .005  -.002   .006  -.014   .005   .009   .010  -.007   .005
  5 0  25.000   .050   .006   .008  -.008   .004  -.002   .006  -.013   .005   .008   .009  -.006   .005
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  7 0  35.000   .050   .005   .007  -.007   .003  -.002   .006  -.012   .004   .006   .008  -.005   .003
  8 0  40.000   .050   .004   .007  -.007   .003  -.002   .006  -.012   .004   .006   .007  -.004   .003
  9 0  45.000   .050   .004   .006  -.006   .003  -.002   .005  -.011   .004   .005   .007  -.004   .003
 10 0  50.000   .050   .004   .006  -.006   .003  -.002   .005  -.011   .004   .005   .007  -.004   .003
 11 0  55.000   .050   .004   .006  -.006   .003  -.002   .005  -.011   .003   .005   .006  -.003   .003
 12 0  60.000   .050   .004   .006  -.005   .002  -.002   .005  -.010   .003   .005   .006  -.003   .002
 13 0  65.000   .050   .003   .005  -.005   .002  -.002   .005  -.010   .003   .004   .006  -.003   .002
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15	0	75.000	.050	.003	.005	-.005	.002	-.002	.004	-.010	.003	.004	.005	-.003	.002
16	0	80.000	.050	.003	.005	-.005	.002	-.002	.004	-.009	.003	.004	.005	-.003	.002
17	1	85.000	.050	.003	.005	-.005	.002	-.002	.004	-.009	.003	.004	.005	-.003	.002
18	1	90.000	.050	.003	.004	-.005	.002	-.002	.004	-.009	.002	.004	.005	-.003	.002
19	1	95.000	.050	.003	.004	-.005	.002	-.002	.003	-.009	.002	.004	.005	-.003	.002
20	1	100.000	.050	.003	.004	-.005	.002	-.002	.003	-.009	.002	.004	.005	-.003	.002
21	1	105.000	.050	.003	.004	-.005	.002	-.002	.003	-.009	.002	.004	.004	-.003	.002
22	1	110.000	.050	.003	.003	-.005	.002	-.001	.003	-.008	.002	.004	.004	-.003	.002
23	1	115.000	.050	.003	.003	-.005	.001	-.001	.002	-.008	.002	.004	.004	-.003	.002
24	0	120.000	.050	.003	.003	-.005	.001	-.001	.002	-.008	.001	.004	.003	-.003	.002
25	0	125.000	.050	.003	.002	-.004	.001	-.001	.001	-.008	.001	.004	.003	-.003	.001
26	0	130.000	.050	.003	.002	-.004	.001	-.001	.001	-.007	.001	.004	.003	-.003	.001
27	0	135.000	.050	.003	.001	-.004	.001	-.001	.000	-.006	.000	.004	.002	-.003	.001
28	0	140.000	.050	.003	.001	-.004	.000	-.001	.000	-.006	.000	.004	.001	-.003	.001
29	0	145.000	.050	.002	.000	-.004	.000	-.001	.000	-.004	.000	.004	.000	-.003	.000
30	0	150.000	.050	.002	.000	-.003	.000	-.001	.000	-.003	.000	.003	.000	-.002	.000
31	0	155.000	.050	.001	.000	-.002	.000	-.000	.000	-.001	.000	.002	.000	-.002	.000
32	0	.152	.087	.025	.026	-.018	.024	.005	.007	-.006	.007	.041	.050	-.027	.043
33	1	84.375	.050	.003	.005	-.005	.002	-.002	.004	-.009	.003	.004	.005	-.003	.002
34	1	119.224	.050	.003	.003	-.005	.001	-.001	.002	-.008	.001	.004	.004	-.003	.002